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THE LAKE CRESCENT REGION, OLYMPIC MOUNTAINS, WASHINGTON, WITH NOTES REGARDING ITS AVIFAUNA.

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Plates XIX–XXI.

As there exists only a general knowledge of the ornithology of the country in which the following observations were made, and as the region is but imperfectly known, it is thought advisable to give in connection with the list of species, a description of the country, the forest conditions that prevail, and also some idea of the flora, since these factors and the avifauna are correlative. Regarding the climatic conditions, however, little can be definitely stated as there are no data of an official character available, although the importance of this factor is its relationship to the bird life is fully recognized.

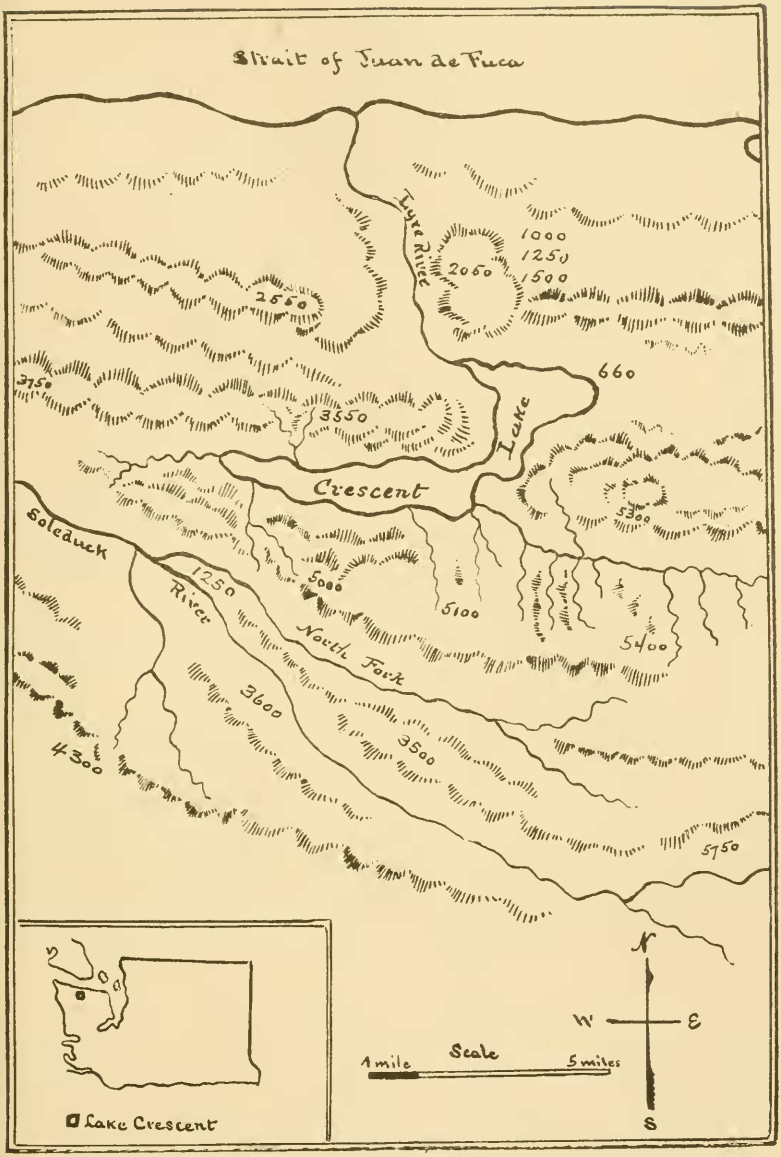
The writer's visit to the region covered the greater part of May and early October, 1915, the latter half of April and June, and early July, 1916; during this period all the territory immediately contiguous to the lake was thoroughly investigated, and numerous trips were made along the few trails adjacent thereto, as well as up the mountain sides. As a result, much knowledge was obtained regarding the species enumerated below but we were impressed with the fact that in a region so diversified, considerable future observation is required before a definite knowledge of its

avifauna is obtained, especially of the detailed distribution of the species.

At an elevation of 550 feet above sea level, Lake Crescent, or Crescent Lake as it is sometimes called, is located in the northwestern part of the State of Washington in the Olympic Peninsula at the very threshold of the Olympic Mountains. Its area is six and eight-tenths square miles, it has an extreme length of about ten miles with a varying width of from one half to one and a quarter miles, excepting at its lower end where it expands to three miles. The shore line is approximately twenty-five miles, but is very irregular with many indentations. As the name implies, the lake is of a somewhat crescent shape, the result of this peculiarity being that while the northern or lower end is less than five miles distant from the Strait of Juan de Fuca, the western or upper end lies within the Olympic range, being surrounded by mountains that constitute a part of this system. Its shores in general are bold and rugged, and in places the mountains rise abruptly from the water, which is clear and transparent as is usually the case in mountain lakes.

The beaches along the lake have been formed in the past by the detritus from the mountains. They are very narrow and invariably covered or overhung with a deciduous growth of shrubs or trees of small size, which extend back only to the base of the mountains. The latter are in turn clothed with a dense coniferous growth extending clear to their summits. In places on the mountain sides are seen the effects of former forest fires as evidenced by the burned and dead timber, but these are quite limited, the general aspect being an unbroken forest. These burned areas are practically impenetrable, for over the confusion of fallen trees has sprung a dense growth of young conifers interspersed in spots with small deciduous trees, all this in turn being penetrated by the still standing dead timber.

At the northwestern extremity of the lake is its outlet, the Lyre River, which following a valley flows in a meandering line some six miles before discharging its waters into the strait. A marked difference exists in the topographical aspect of the section about this lower end as compared with the upper, as here the mountains are of less elevation, being somewhat broken, and represent the water shed between the lake and strait, and this particular section



LOCATION OF CRESCENT LAKE.

is also more open in its appearance, having been somewhat logged off in the past and to some extent swept by fires.

About three miles up the lake from its outlet is the "narrows," so called locally, this being a contraction of the lake to a width not exceeding one half a mile. Here the mountains rise on the western side to an elevation of 2800 feet, on the eastern side to 5300 feet, thus forming a gateway to the upper or larger portion of the lake lying within the Olympic Mountains proper, which attain an extreme altitude of 3550 feet on the north side and 5000 feet on the south side. These two ranges do not coalesce but remain separate, the former continuing in a general westerly direction paralleling the strait, the latter trending more towards the southwest, while between them lies a valley running from the head of the lake and eventually descending to the Soleduck River which flows westerly and southwesterly, discharging its waters into the Pacific.

We have been thus explicit regarding the topography of the region, as in a degree it is reflected in the distribution of some of the species, several of which were found confined entirely to the lower end of the lake, while in others a marked difference existed in the relative abundance of the individuals at its two extremities.

All the altitudes given above are based on the contour map accompanying the paper from which the following data relative to forest conditions are quoted.[1]

"Township 30 North, Range 9 West." "This township, lying in the northern part of the reserve, includes nearly all of Lake Crescent. The surface of the township is rugged and mountainous, the only exception being along the north line and the valley of Lyre River. The soil is clay in the lowlands and gravel upon the mountains. Underbrush is very dense. This township is heavily timbered, mainly with fir and hemlock, with a little cedar and spruce."

"Forest conditions in T. 30 N., R. 9 W.

Timbered area	acres	22,336
Lake area	do	4,352
Burned area	do	1,115

[1] Professional Paper No. 7 — Series H, Forestry, 4. Department of the Interior, United States Geological Survey, Forest Conditions in the Olympic Forest Reserve, Washington, from notes by Arthur Dodwell and Theodore F. Rixon. Government Printing Office, Washington, 1902. pp. 86–87.

Total stand of timber	feet B. M.	$76,250,000
Average stand per acre	do	40,000
Depth of humus	inches	3
Litter		Light

Statistics of forest trees.

Species	Stand Million ft. B. M.	Height Feet.	Diameter Inches.	Clear Feet.	Dead Per cent.	Diseased Per cent.	Age Years.
Red fir	549¾	170	36	45	5	7	194
Cedar	48½	115	31	24	9	25	162
Hemlock	203½	122	16	23	6	9	138
Spruce	16½	174	45	54	2	5	192
Lovely fir	58	163	34	47	2	6	166"

Apparently but little change has taken place in the conditions of the region since the date of the report from which the foregoing was taken; as we have been fairly familiar with the region for the past eighteen years, having made hunting trips therein on various occasions.

No better general description of the flora of the region, as we found it, can be given than the following, by Mr. Charles V. Piper. "The vegetation of the uplands throughout the Pacific area in Washington is a plant association in which the red fir predominates. The size of this tree and the luxuriance of the associated plants varies with character of the soil, but otherwise the formation is remarkably uniform. In forests in dry or sterile soils the commonest undershrubs are salal (*Gaultheria shallon*) and Oregon grape (*Berberis nervosa*), while the bracken fern (*Pteridium*) is the most conspicuous herb. Shrubs or trees of Scouler willow (*Salix scouleriana*) are also constantly associated.

In better soils the same shrubs remain, but the salal especially becomes much more luxuriant, often forming almost impenetrable thickets. When, however, the red fir is at its best, forming dense forests into which the sun scarcely penetrates the salal and Oregon grape are usually much less conspicuous. Under such circumstances the ground is covered with a thick layer of mosses and scattered crowns of Chamisso's shield fern (*Polystichum munitum*). Among the few shrubs which thrive in such dense shade is the red huckleberry (*Vaccinium parvifolium*). Following the destruction of a red fir forest by logging and subsequent burning, as has been

too commonly the case, there is a marked sequence in the plants that appear, usually as follows: The first are nearly always the fireweed (*Epilobium spicatum*) and the bracken (*Pteridium*). These are closely followed by the dewberry (*Rubus macropetalus*) which the following year fruits heavily and then gradually disappears. The thimbleberry (*Rubus parriflorus*) is often abundant also, as is red-flowered currant (*Ribes sanguineum*). By this time the Scouler willow is conspicuous, and in wet places the red alder (*Alnus oregana*). The two trees dominate the vegetation until the young red firs which spring up in a very dense growth have become large enough to supercede them. The red fir is so completely the dominant tree in the region that as a rule it quickly reforests itself whenever destroyed."[1]

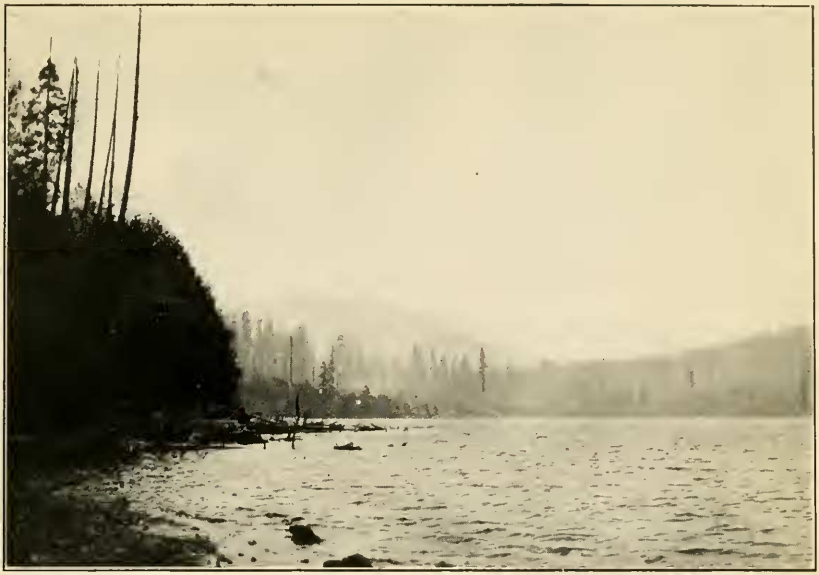
The climate of the region is mild and equable with no extremes in temperature particularly at and near the lake level. The region has an abundant precipitation occurring chiefly between October and July, and an evidence of these prevailing climatic conditions is reflected in the luxuriant growth of vegetation that everywhere abounds.

Although reference to the list will show some few species that are fairly representative of the Canadian Zone, the region is mainly Transition, especially when the character of its dominant vegetation is taken into consideration. The red fir (*Pseudotsuga mucronata*) which forms so large a proportion of the total forest of the region, is a characteristic Transition Zone plant.

In regard to the list which follows the absence of a larger number of species of the water birds, is due to the fact that, at the season during which our observations were made, very few of these are present in the region, but from late autumn until early spring the lake is more or less a temporary resort for many of the maritime birds, that here find a refuge from the storms prevailing at times along the coast to the northward of the region under consideration.

In conclusion we wish to express our thanks to the Bureau of Biological Survey at Washington, D. C., for the identification of specimens forwarded, a courtesy that is much appreciated.

[1] Smithsonian Institution, United States National Museum, Contributions from the United States National Herbarium, Volume XI. Flora of the State of Washington by Charles V. Piper, Washington, 1906.



1. LOWER LAKE LOOKING WEST TOWARD LYRE RIVER.
2. NORTH SIDE OF UPPER LAKE.

1. **Æchmophorus occidentalis.** WESTERN GREBE.— Noted as a rather common migrant in April and October. One taken October 10.

2. **Podilymbus podiceps.** PIED-BILLED GREBE.— Seen occasionally in April, but was common on the lake in October.

3. **Gavia immer.** LOON.— On a number of occasions during April, May and October, this species was seen and heard about the lake.

4. **Larus glaucescens.** GLAUCOUS-WINGED GULL.— Of rather common occurrence in April and October.

5. **Larus occidentalis.** WESTERN GULL.— On several successive days in the latter part of April, a number of adults of this species were seen on and about the upper part of the lake.

6. **Larus heermanni.** HEERMANN'S GULL.— An adult female was taken on the lake June 20, 1916. It was in somewhat worn plumage and very lean flesh, and its stomach entirely devoid of contents.

7. **Sterna paradisæa.** ARCTIC TERN.— On April 15 a flock of about fifteen were seen in flight about the lake. The next day four were noted and on May 3 following a single individual was observed swimming about on the lake, it allowing an approach to within one hundred feet.

8. **Mergus americanus.** MERGANSER.— Seen at various times during April and May. Breeds along the larger mountain streams.

9. **Anas platyrhynchos.** MALLARD.— Noted on a number of occasions in October.

10. **Clangula clangula americana.** GOLDEN-EYE.— Single individuals were seen about the lake a number of times during April.

11. **Histrionicus histrionicus.** HARLEQUIN DUCK.— On April 24 two males and a female of this beautiful species were seen, and on the following day one of the former was secured.

12. **Oidemia deglandi.** WHITE-WINGED SCOTER.— May 18, 1915, three were observed flying up the lake.

13. **Ardea herodias fannini.** NORTHWESTERN COAST HERON.— A pair of these birds were noted at various times during the entire period of our stay at the lake, and evidently nested in proximity thereto.

14. **Fulica americana.** COMMON COOT.— Several pairs of these birds could always be found in the small marsh near the source of the Lyre River during the breeding season, but the species was not seen in October.

15. **Lobipes lobatus.** NORTHERN PHALAROPE.— Noted but once, when a small flock was seen on the lake early in October.

16. **Lophortyx californica californica.** CALIFORNIA QUAIL.— Northeast of the Lyre River is a limited section that has been logged and subsequently burned over, and here several times in October we came across a few of these Quail.

17. **Dendragapus obscurus fuliginosus.** SOOTY GROUSE.— Fairly common and although in April and May seemingly restricted to and near the semi-barren slopes at a considerable altitude on the mountain sides, from which its peculiar hooting note could be heard almost any day; in October it was found much lower and at times not far above lake level.

18. **Bonasa umbellus sabini.** OREGON RUFFED GROUSE.— Not common and generally found in the territory adjacent to the lake, but owing to the expanse of forest it was seldom seen.

19. **Columba fasciata fasciata.** BAND-TAILED PIGEON.— On May 22, 1915, four were seen in flight above the timber, and June 23, 1916, a juvenile scarcely able to fly, was found near the lake.

20. **Accipiter velox.** SHARP-SHINNED HAWK.— At the eastern extremity of the lake on May 28, we came across a pair of these birds that were watched for some time. The species was also noted in October.

21. **Buteo borealis calurus.** WESTERN RED-TAIL.— Was seen and heard on several occasions in the timber near the lake in May and October.

22. **Haliæetus leucocephalus leucocephalus.** BALD EAGLE.— A pair were often seen about the lake, particularly the upper part where for years has been located a nesting site.

23. **Falco columbarius suckleyi.** BLACK PIGEON HAWK.— One record only, October 12, a single bird which appeared to be in unusually dark plumage.

24. **Falco sparverius phalæna.** DESERT SPARROW HAWK.— On May 28, one was heard and seen at the lower end of the lake, the only time the species was noted.

25. **Strix occidentalis caurina.** NORTHERN SPOTTED OWL.— During the night of October 12, the weird notes of this bird shifting from place to place were heard in the forest along the lake near where we were located, and although the weather was very stormy, its notes continued with but slight intermission until daybreak.

26. **Otus asio kennicotti.** KENNICOTT'S SCREECH OWL.— Near the western end of the lake on various evenings in April and May, we heard the notes of this bird many times repeated, coming from the forest near the water's edge.

27. **Bubo virginianus saturatus.** DUSKY HORNED OWL.— On several occasions in April and May, this Owl was heard at night hooting in the forest.

28. **Glaucidium gnoma californicum.** CALIFORNIA PYGMY OWL.— One seen July 2, in open timber on the mountain side at an elevation of 1700 feet above the lake.

29. **Ceryle alcyon caurina.** WESTERN BELTED KINGFISHER.— Not common, but noted at various times during the period of our stay at the lake.

30. **Dryobates villosus harrisi.** HARRIS'S WOODPECKER.— Quite common and generally found in the more open forest not far from the lake, although occasionally seen in the partly dead timber on the mountain side. A nest found May 24, contained fully fledged young.

31. **Sphyrapicus ruber notkensis.** NORTHERN RED-BREASTED SAPSUCKER.— Although observed but twice, this in May and October, its frequent occurrence was indicated by the numerous perforations in the bark of many of the trees in the region.

32. **Phlœotomus pileatus pileatus.** PILEATED WOODPECKER.— Although not very common, was quite often seen or heard in the forest on the mountain side.

33. **Asyndesmus lewisi.** LEWIS'S WOODPECKER.— On May 2, 1916, one was seen in tall timber near the lake, and on the following day, four at a point about ten miles east of the lake's lower end.

34. **Colaptes cafer saturatior.** NORTHWESTERN FLICKER.— Not very common in April, May and June, but during October was seen frequently and was more generally distributed.

35. **Chætura vauxi.** VAUX'S SWIFT.— Seven of these swifts were seen on June 29, circling about above the high timber in the vicinity of the lake, and the species was also noted in the valley of the Soleduck River, six miles west of the head of the lake.

36. **Selasphorus rufus.** RUFOUS HUMMINGBIRD.— Was common throughout the region during May and June, but particularly so near lake level. On several occasions during the latter part of May, individual birds were seen carrying nesting material.

37. **Nuttallornis borealis.** OLIVE-SIDED FLYCATCHER.— Along the entire length of the lake in May and June, the characteristic note of this species was heard from the mountain side, but apparently each pair of the birds had a more or less defined territory of its own. They could readily be located as they almost invariably perched on or near the top of some lofty evergreen tree, rarely descending even during the frequent rainy spells.

38. **Myiochanes richardsoni richardsoni.** WESTERN WOOD PEWEE. — Noted in May, June and July and not very common. A species of irregular distribution in the region, being oftener found about the lower part of the lake, particularly in the vicinity of the Lyre River. We have three records only for the upper lake section.

39. **Empidonax difficilis difficilis.** WESTERN FLYCATCHER.— Although not common was quite well distributed, being restricted to no particular locality. Noted in May, June and July.

40. **Empidonax trailli trailli.** TRAILL'S FLYCATCHER.— Of uncommon occurrence and only seen or heard in the alder and willow thickets, along or near the shore of the lake.

41. **Empidonax hammondi.** HAMMOND'S FLYCATCHER.— Rather common. Although at times found on the mountain side, it was more often heard or seen in the timber fairly adjacent to the lake. A shy retiring species and not easy to secure.

42. **Empidonax wrighti.** WRIGHT'S FLYCATCHER.— Wright's was the only Flycatcher that we found in the mountains at any considerable elevation, and on a few occasions in May and June it was also noted in the region near lake level.

43. **Cyanocitta stelleri stelleri.** STELLER'S JAY.— Only two of these birds were heard or seen in the region from April to July, but in October it was observed more frequently.

44. **Perisoreus obscurus obscurus.** OREGON JAY.— During April it was common in the vicinity of the lake, at this time being associated in small flocks that were feeding on a winged insect very abundant near the water's edge. But after early May the species was seldom seen, evidently having retired to the more elevated sections as from this date we rarely noted it below an altitude of 1000 feet. A breeding female was taken June 22 at an elevation of about 800 feet. Was quite common about the lake in October.

45. **Corvus corax principalis.** NORTHERN RAVEN.— Two were seen in October in some tall dead timber on the mountain side above the lake. Also noted in the valley of the Soleduck River.

46. **Corvus caurinus.** NORTHWESTERN CROW.— Apparently of irregular occurrence in the region. Our records are, May 26, 1915, a single bird feeding along the lake shore near the source of the Lyre River; April 23 and 27, 1916, a total of three seen about the upper part of the lake.

47. **Agelaius phœniceus caurinus.** NORTHWESTERN RED-WING.— Near the outlet of the lake is a very small marsh restricted to a bit of the shore, and here is located a little colony of this species during the spring and summer months.

48. **Loxia curvirostra minor.** CROSSBILL.— At various times during October, small flocks of Crossbills were seen in the timber along the lake and on the mountain side.

49. **Astragalinus tristis salicamans.** WILLOW GOLDFINCH.— Not common. Noted only in May and June, when a few were heard and seen on different occasions.

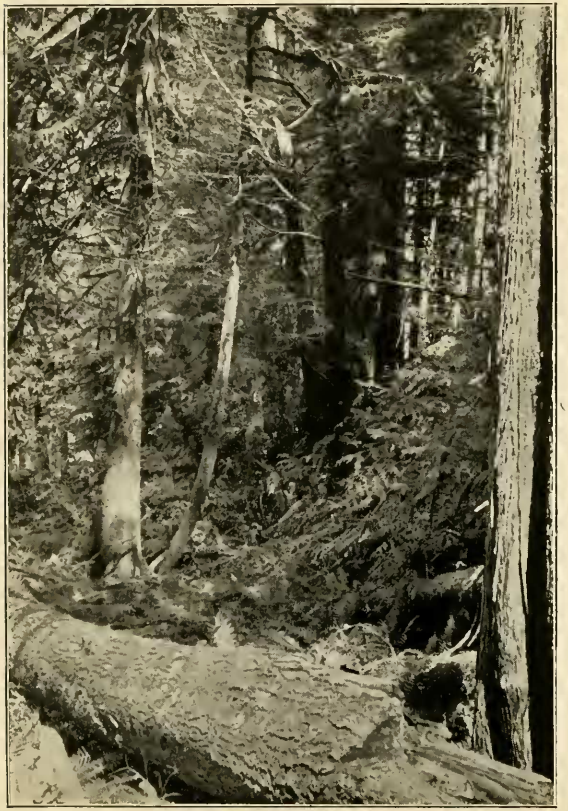
50. **Spinus pinus.** PINE SISKIN.— In the more open section about the lake's lower end, the Pine Siskin was quite common in May, although only occasionally seen around the upper portion of the lake. Was rarely noted in October.

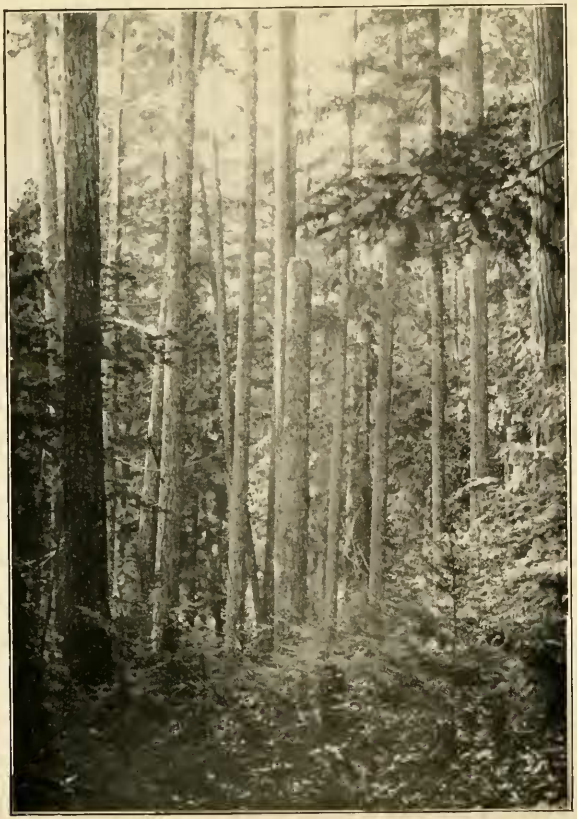
51. **Passerculus sandwichensis sandwichensis.** ALEUTIAN SAVANNAH SPARROW.— In October was found about the lake feeding along the rocky shores, but was not at all common, seldom more than a single bird being seen at a time.

52. **Zonotrichia leucophrys nuttalli.** NUTTALL'S SPARROW.— Uncommon throughout the region and of local distribution during May and June, a few being found in the section near the Lyre River and two along the upper lake. Not noted in October.

53. **Zonotrichia coronata.** GOLDEN-CROWNED SPARROW.— Not uncommon in April, the first arrival being noted the 22d and by the 30th all had departed. In October somewhat more common, being found about the borders of the brushy clearings along the lake, and on these occasions the individuals were associated in small flocks.

54. **Junco hyemalis connectens.** SHUFELDT'S JUNCO.— Common throughout the region although somewhat localized in its distribution, being partial to the vicinity of the more open spaces and was often observed along the lake shore about the edge of the timber. All the Juncos collected





VIEWS IN THE FOREST BORDERING CRESCENT LAKE.